## Excerpt from

# **English Language Learners and the Next Generation Science Standards**

#### **CASE STUDY 4**

Vignette: Developing and Using Models to Represent Earth's Surface System

#### Introduction

The scientific and engineering practices described in the NGSS are language intensive and present both language demands and language learning opportunities for English language learners. This vignette illustrates how very young students, many of whom are English language learners, can develop proficiency in these language intensive scientific practices while engaging with rigorous science content. With a focus on Earth science, the teacher powerfully demonstrates how her students overcome language barriers to use models, develop claims, and explain their reasoning using evidence. The vignette highlights effective strategies to provide English language learners' access to core ideas, practices, and crosscutting concepts of science. Throughout the vignette, classroom strategies that are effective for all students, particularly for English language learners according to the research literature, are highlighted in parentheses.

## **ELL Connections**

Like all of the classes at Monroe Elementary, a school with more than 74% of the population at or below the poverty level, Ms. H.'s 2<sup>nd</sup> grade class was made up of diverse groups of learners. Her class included three Hmong students, eight African-Americans, three students who recently arrived from Gambia, two from Mexico, and two Mexican-Americans. Of her eighteen children, nine were English language learners.

Three weeks into the Earth science unit, Ms. H. introduced a task in which students had

to rely on their team members, their field notes and their diagrams of soil profiles to match three different types of soil to their source locations. Each team of three students had paper plates piled with soil on the table in front of them and three location cards. The unidentified soil samples came from sites within walking distance of Monroe School. One card was labeled "Urban Marsh" and had a picture of the marsh near the school. The other cards were labeled "Coniferous Hill" and "School Yard Field" with respective photos. (Ms. H. used these labeled cards with photos to represent concepts as a language support strategy for English language learners.)

Throughout the unit, each team had dug small soil pits in the three locations, recorded data about soil composition and function (e.g., infiltration), and designed, to scale, diagrams of soil profiles for each site. (Practices: Analyzing and Interpreting Data, and Using Mathematics and Computational Thinking.)



Now, with their teams, they were making claims, looking for evidence to support their claims,

and recording their reasoning on large white boards. (Practice: Engaging in Argument from Evidence.)

Later in the vignette...

After sharing the parent interviews and hearing Mrs. Xiong's presentation, the class was convinced that soil was different in different places, but they wanted to be sure that this was true for soil from different places in their neighborhood, too. Ms. H. tried to center her science investigations in culturally relevant contexts, in this case their neighborhood. (*This "place-based" strategy established connections between school science and the students' community and lives.*)

Ms. H. encouraged students to gather physical evidence for their claim that "soil was different in different places." They decided that the best way to support their claim was to observe soil taken from different places near the school. (Practice: Planning and Carrying Out Investigations.) They used a topographical map and an aerial photo map of the neighborhood to determine soil sites that seemed different: a hill, the marsh, and the school yard. They noticed that the sites had different trees—deciduous trees, no trees, and coniferous trees—and they also had different elevations. (DCI: K-2-ESS2.B Earth's Systems.) It was at these sites that the students collected and investigated the soil, forming the basis for comparisons based on evidence and the soil profile diagrams each group constructed.

The following week, Ms. H. helped her students think in terms of patterns when exploring similarities and differences in the soil in the neighborhood. (CCC: Patterns.)